

WHAT IS CLAIMED IS:

1. A volume data encoder for encoding volume data that are image data having a three-dimensional spatial pixel arrangement, the volume data encoder comprising:

5 a two-dimensional transform unit for conducting two-dimensional frequency decomposition on two-dimensional consecutive images;

skip detection means for detecting the same data portion which can be skipped in the frequency decomposition and encoding 10 processing, when further conducting one-dimensional frequency decomposition and subsequent encoding processing on transform coefficients obtained from the two-dimensional transform unit;

a one-dimensional transform unit for conducting the one-dimensional frequency decomposition except the portion 15 detected by the skip detection means which can be skipped; and

an encoding processing unit for conducting encoding on data subjected to the frequency decomposition in the one-dimensional transform unit, except the portion which can be skipped.

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2. The volume data encoder according to claim 1, further comprising storage means for storing a result of detection conducted by the skip detection means.

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3. The volume data encoder according to claim 1,

comprising:

a unit block division unit for dividing inside of a subband block, which is obtained by conducting three-dimensional frequency decomposition on volume data obtained by conducting 5 the two-dimensional and one-dimensional transform, into unit blocks, which are smaller three-dimensional blocks; and adaptive encoding means for conducting adaptive encoding on each of the unit blocks with a suitable encoding parameter.

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4. The volume data encoder according to claim 2, comprising:

a unit block division unit for dividing inside of a subband block, which is obtained by conducting three-dimensional frequency decomposition on volume data obtained by conducting 15 the two-dimensional and one-dimensional transform, into unit blocks, which are smaller three-dimensional blocks; and adaptive encoding means for conducting adaptive encoding on each of the unit blocks with a suitable encoding parameter.

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5. The volume data encoder according to claim 3, comprising:

means for calculating statistical values of coefficients 25 for each of all unit blocks in the subband; means for classifying the unit blocks into classes according to the statistical values; and

means for storing a result of the classifying,
wherein the adaptive encoding means uses a common encoding
parameter for each of the classes when encoding unit blocks.

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6. The volume data encoder according to claim 4,
comprising:

means for calculating statistical values of coefficients
for each of all unit blocks in the subband;

10 means for classifying the unit blocks into classes
according to the statistical values; and

means for storing a result of the classifying,
wherein the adaptive encoding means uses a common encoding
parameter for each of the classes when encoding unit blocks.

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7. The volume data encoder, comprising means for
compressing information held in the detection result storage
means according to claim 2 and the classifying result storing
20 means according to claim 5,

wherein the compressed information is added to encoded
data.

25 8. The volume data encoder according to claim 1, comprising
means for separating header information from pixel information,
if information other than the pixel information accompanies each

of a plurality of two-dimensional images forming the volume data, as the header information,

wherein the header information is processed apart from the pixel information, and a result of compression using a common 5 portion of a plurality of kinds of header information is added to encoded pixel data.

9. The volume data encoder according to claim 2, comprising 10 means for separating header information from pixel information, if information other than the pixel information accompanies each of a plurality of two-dimensional images forming the volume data, as the header information,

wherein the header information is processed apart from 15 the pixel information, and a result of compression using a common portion of a plurality of kinds of header information is added to encoded pixel data.

20 10. The volume data encoder according to claim 3, comprising means for separating header information from pixel information, if information other than the pixel information accompanies each of a plurality of two-dimensional images forming the volume data, as the header information,

25 wherein the header information is processed apart from the pixel information, and a result of compression using a common portion of a plurality of kinds of header information is added

to encoded pixel data.